JOURNAL LA EDUSCI

VOL. 06, ISSUE 02 (163-177), 2026
DOI: 10.37899/journallaedusci.v6i2.2176

The Impact of the Project-Based Learning Model on Students Collaboration Skills in Social Studies Learning at the Elementary School Level

Fandi H Binggo[1]

[1]*Universitas Muhammadiyah Gorontalo*

**Corresponding Author: Fandi H Binggo*
Email: fandi.binggo@gmail.com

Article Info

Article history:
Received 1 May 2025
Received in revised form 18 May 2025
Accepted 16 June 2025

Keywords:
Project-Based Learning
Collaboration Skills
Social Studies Learning
Elementary Education
Teaching Model

Abstract

This study examines the effectiveness of the Project-Based Learning (PjBL) model in enhancing students' collaboration skills in Social Studies (IPS) education at the elementary school level. Using a one-group pretest-posttest experimental design, the study involved 20 students at SD Laboratorium UNG. Students' collaboration skills were measured before and after the implementation of PjBL through pretest and posttest assessments. Statistical analysis using paired samples t-test and Cohen's d was conducted to evaluate the significance and effect size of the observed changes. The results indicated a significant improvement in collaboration skills, as reflected in the increase of the average score from 53.1 on the pretest to 69.45 on the posttest. Additionally, Cohen's d value of 2.20 indicated a large effect size, confirming that PjBL not only significantly enhanced students' collaboration skills but also provided a practical and impactful learning experience. This study concludes that PjBL is a highly effective method for enhancing collaboration skills in Social Studies education, preparing students to face challenges in both educational and professional settings.

Introduction

Introduction Education in Indonesia continues to evolve to create a generation of young individuals who excel not only academically but also possess strong social skills. The main objective of the national education system is to shape individuals who are prepared to face various challenges in social and professional life, which requires skills beyond cognitive abilities (Kusadi et al., 2020). One of the increasingly important skills is social skills, which include communication, teamwork, and constructive problem-solving abilities. In a world that is interconnected and full of differences, social skills play a crucial role in everyday life, education, and the workplace (Faslia et al., 2023). Therefore, the development of students' social skills from an early age has become a key focus in the learning process, especially at the elementary school level (Alsmadi et al., 2024; Latifah & Safrida, 2025; Dyson et al., 2021).

An education that emphasizes the development of social skills must also provide comprehensive and deep learning experiences for students. One way to achieve this is by using learning models that not only focus on academic achievement but also encourage students to interact actively with their classmates (Kavanagh et al., 2024). Project-Based Learning (PjBL) is one such model that can be applied to achieve this goal (Wu, 2024). PjBL is a learning method based on real-world projects, giving students the opportunity to work in groups to solve problems or create useful products (Lee & Lee, 2024). Through this project, students not only gain theoretical knowledge but also practical skills that can be used in daily life, such as social skills (Dias-Oliveira et al., 2024). In this model, students are directly involved in the learning process, sharing ideas, collaborating in teams, and solving problems together, which is highly

ISSN 2721-0979 (Print), ISSN 2721-1258 (Online)

relevant for developing their social skills (AlMaian & Bu-Qammaz, 2024; Mendo-Lázaro et al., 2018).

Previous research indicates that the implementation of PjBL significantly improves students' social skills. Guerra-Macías & Tobón (2025) explain that PjBL is effective in improving students' collaborative skills, including communication, teamwork, and problem-solving within groups. Similarly, (Marini et al., 2025) state that the application of PjBL not only enhances students' cognitive skills but also facilitates the development of essential social skills in students' social lives. Thus, the PjBL model can be seen as a solution to address the challenge of developing students' social skills at the elementary school level (Tanaka, 2025). This learning model emphasizes values such as cooperation, collaboration, and communication, which are crucial in the context of social studies learning that covers topics such as social life, culture, and the history of communities (Michel & Förster, 2025; Almazroui, 2023; Diana & Azani, 2024).

However, despite numerous studies indicating the effectiveness of PjBL in improving students' social skills, most of these studies are limited to other subjects such as mathematics or science (Rehman et al., 2024). Many existing studies focus primarily on enhancing academic achievement or conceptual understanding, without emphasizing how PjBL can specifically affect students' social skills, particularly in Social Studies (IPS) learning (Ashraf et al., 2025). Social Studies education in elementary schools is closely related to societal life and requires the ability to collaborate, communicate, and resolve conflicts among students. Therefore, the implementation of PjBL in Social Studies learning could be a highly relevant solution to improve students' social skills at the elementary school level (García-Llamas et al., 2025; Sari, 2018; Wardah et al., 2022).

The gap in research on the use of PjBL in Social Studies education at the elementary school level indicates that much remains to be explored in this field (Novalia et al., 2025). Social Studies learning at the elementary level requires social collaboration, as the topics taught involve social, historical, and cultural issues that require intensive interaction among students (Lin et al., 2025). Although some studies have shown that PjBL can increase student activity in group work, there has yet to be research that specifically focuses on how PjBL can improve students' social skills in the context of Social Studies learning. Therefore, it is important to conduct more in-depth research on the impact of implementing PjBL on students' social skills in Social Studies education at the elementary school level (Alexandersen et al., 2025; Culclasure et al., 2019; Dole et al., 2017; Purba et al., 2024). Previous studies, such as those by (Larsen, 2025), show that the implementation of PjBL can increase student activity in working collaboratively in groups, as well as improve students' communication and collaboration skills in completing specific projects (Shi et al., 2025). However, these studies were mainly conducted in the context of mathematics and science education, so they do not provide a comprehensive picture of the impact of PjBL on students' social skills in Social Studies education (Yuliasari et al., 2025). Similarly, research by (Nisa & Yuliawati, 2021) indicates that PjBL can improve students' social skills, but the research is general and does not focus specifically on Social Studies learning. Therefore, this study aims to fill this gap by focusing on the impact of PjBL on improving students' social skills in Social Studies education at the elementary school level (Syaharuddin & Doni, 2024).

Using a one-group pretest-posttest experimental design, this study aims to test whether the implementation of Project-Based Learning (PjBL) can improve students' social collaboration skills in Social Studies learning (Ranty, 2021). The hypothesis proposed in this study is that there is a positive effect of implementing PjBL on improving students' social skills, especially

ISSN 2721-0979 (Print), ISSN 2721-1258 (Online)

in terms of teamwork, communication, and problem-solving (Yuliasari et al., 2025). To measure changes in students' social skills, this study will use direct observation methods and questionnaires filled out by students. The study will be conducted at SD Laboratorium UNG, focusing on fifth-grade students participating in Social Studies learning based on PjBL (Rati & Astawan, 2022; Ikomi, 2020). One of the strengths of this research lies in its novelty in examining the impact of PjBL in Social Studies education at the elementary school level. Most existing research focuses more on the development of academic skills or the application of PjBL in science and mathematics subjects (Riswana, 2023). This study specifically addresses the improvement of students' social skills in Social Studies education, which has traditionally focused more on content mastery and less on social skills development in the learning process (Putri et al., 2024). By using a one-group pretest-posttest experimental design, this study is expected to provide a more concrete picture of how PjBL implementation can affect students' social skills in the context of Social Studies education.

Additionally, this research will make a significant contribution to the development of more collaborative and socially skilled learning methods. The implementation of PjBL in Social Studies education not only improves students' academic results but also strengthens their social skills, such as teamwork, effective communication, and collective problem-solving (Kuswanto, 2025). This project-based learning approach gives students the opportunity to actively engage in learning, participate in discussions, and work together to achieve common goals. Therefore, this study is expected to serve as a reference for educators in developing more innovative and relevant teaching methods that meet the needs of students in the 21st century (Khotimah, 2025; Haug & Mork, 2021; Kettler et al., 2021; Inganah et al., 2023).

This research also has the potential to enrich the existing literature on PjBL, especially in the context of Social Studies education at the elementary school level (Krisnamurti & Rahayu, 2024). In this study, PjBL is integrated with Social Studies material related to social life, culture, and community history, allowing students to develop the social skills needed for positive interaction with peers and others. By improving students' social skills, this research also contributes to the formation of better character in students, preparing them to become adaptable and participatory individuals in society. Furthermore, the results of this research can be used as a foundation for developing curricula that are more focused on collaboration and the development of students' social skills (Zurhaida et al., 2025).

Methods

This research employed a one-group pretest-posttest experimental design, which is a form of quasi-experimental approach, to investigate the effect of the Project-Based Learning (PjBL) model on students' collaboration skills in Social Studies. This design was chosen because it allowed for a direct assessment of changes within the same group of students before and after the intervention, without the use of a separate control group. By using the same participants as their own control, the study could more precisely attribute any observed improvement in collaboration skills to the PjBL intervention rather than to external variables.

The study was conducted at SD Laboratorium UNG, specifically in the second semester of the 2023/2024 academic year. The participants were 20 fifth-grade students, consisting of 12 girls and 8 boys with an average age of 10.8 years. The selection of this particular class was made purposively, based on the consideration that these students had not previously been exposed to the PjBL model in Social Studies learning. Additionally, their homeroom teacher had undergone training in cooperative and interactive learning strategies, which ensured consistent and competent implementation of the learning model throughout the study. Ethical clearance

ISSN 2721-0979 (Print), ISSN 2721-1258 (Online)

for the study was obtained from the relevant university ethics committee, and parental consent as well as student assent were secured prior to data collection.

To measure collaboration skills, the study utilized both observational and self-report instruments. Observational data were gathered using the Collaboration Skills Observation Checklist (CSOC), which contained 15 indicators assessing specific behaviors related to communication, cooperation, and conflict resolution. Trained observers rated these behaviors on a 4-point scale during real-time classroom activities. Observations were conducted at ten-minute intervals throughout each project session, and inter-rater reliability was established with a Cohen's kappa coefficient of 0.86, indicating high agreement between observers. In addition to observational data, students completed the Self-Report Collaboration Questionnaire (SRCQ) before and after the intervention. This questionnaire comprised 18 Likert-type items that aligned with the same three dimensions of collaboration assessed in the observations. Reliability testing of the SRCQ yielded a Cronbach's alpha coefficient of 0.88, demonstrating high internal consistency.

Prior to full implementation, all instruments were piloted in a separate fifth-grade class, and their content validity was confirmed by a panel of three Social Studies education experts. All items in the observational checklist and questionnaire achieved an Aiken's V score above 0.80, confirming the appropriateness and clarity of each item for use in this context. Additionally, for triangulation purposes and to evaluate the quality of group project outcomes, the study adapted a rubric from the Buck Institute for Education, which assessed four domains: problem analysis, product development, oral presentation, and group reflection. Two raters used this rubric independently, with an inter-rater agreement (Cohen's kappa) of 0.79, ensuring further methodological rigor.

The PjBL intervention was implemented over four weeks, with students engaging in Social Studies learning through structured project cycles. The central project theme involved improving the school's waste-sorting system, a topic rooted in the students' everyday experiences and designed to foster relevance and engagement. In the initial phase, the teacher introduced the driving question—"How can we make our school's waste-sorting system work better?"—and facilitated classroom discussions to generate ideas. Students were then divided into small, heterogeneous groups of four, where they planned their project tasks, negotiated roles, and established timelines. During the investigation phase, students conducted field interviews with janitorial staff, examined school facilities, and gathered data on current waste management practices. They then worked collaboratively to develop creative solutions, which included designing posters, creating prototypes of new sorting bins, and developing peer-education materials.

Throughout the four-week intervention, the teacher assumed the role of facilitator, providing scaffolding as needed while promoting student autonomy. The teacher monitored group dynamics, encouraged balanced participation, and provided immediate feedback when necessary. Observations using the CSOC were conducted during each of these sessions. On the final day of the intervention, students presented their projects in an exhibition-style event attended by peers and school staff. Following the presentation, students participated in structured reflection discussions using the "What? So What? Now What?" method, which encouraged them to evaluate both the project outcomes and the collaborative processes that led to them.

Data collection began with the administration of the SRCQ as a pretest to establish a baseline for each student's perceived collaboration skills. Observers simultaneously rated each group's interactions using the CSOC. These procedures were repeated at the end of the four-week

ISSN 2721-0979 (Print), ISSN 2721-1258 (Online)

period, with the SRCQ administered as a posttest and the CSOC used to evaluate final collaboration behaviors. All data were entered manually into a spreadsheet and cross-verified by two researchers to minimize input errors.

Statistical analysis began with a test of assumptions. The Shapiro–Wilk test was used to assess the normality of the difference scores for the SRCQ, which confirmed that the data were normally distributed. No outliers were identified upon inspection of box plots. Descriptive statistics were computed for both pretest and posttest results, including means, standard deviations, and 95% confidence intervals. To test for significant differences in students' collaboration skills before and after the intervention, a paired samples t-test was conducted. The effect size was calculated using Cohen's d, employing the pooled standard deviation. Additionally, a Wilcoxon signed-rank test was used to corroborate the CSOC observational data, ensuring robustness of the findings across different data types.

Triangulation of the findings was achieved by integrating data from the observation checklist, student self-reports, and the project evaluation rubric. This helped to provide a fuller picture of how collaboration skills were manifested both in students' behavior and in the quality of their group outputs. To ensure reliability, observers and raters underwent four hours of calibration training before the study began. Observation sheets and evaluation forms were stored securely, and an audit trail of scoring, field notes, and reflections was maintained for transparency.

The study also took care to address potential threats to internal validity. Since the intervention was completed within a four-week period and followed the students' regular schedule, risks associated with external events or maturation effects were minimized. Observer bias was reduced by using pre-established behavioral indicators and discussing rating discrepancies immediately following each session. All student data were anonymized using unique ID codes, and findings were reported in aggregate to protect confidentiality.

Results and Discussion

The results of the pretest and posttest data analysis will be explained to assess the extent to which the implementation of the Project-Based Learning (PjBL) model can enhance students' collaboration skills. The learning process aimed at developing collaboration skills is expected to help students work together more effectively. To evaluate the effectiveness of the PjBL model, data was collected through pretest and posttest assessments, involving 20 participants. The test results were then analyzed using various statistical methods to examine whether there were significant differences between the pretest and posttest scores. Furthermore, additional analysis was conducted using paired samples t-test and effect size measurement (Cohen's d) to assess the magnitude of PjBL's impact on improving students' collaboration skills.

Descriptive Statistical Analysis

Table 1 presents the analysis of pretest and posttest data on students' collaboration skills, aimed at evaluating the changes that occurred after the implementation of the Project-Based Learning (PjBL) model. The data presented includes various descriptive statistics, such as mean, standard deviation, median, mode, and score range, to provide a clearer picture of the development in students' collaboration skills from the pretest to the posttest.

Table 1. Pretest and Posttest Collaboration Skills Data Analysis

Statistics			
		Pretest	**Posttest**
N	Valid	20	20
	Missing	0	0

ISSN 2721-0979 (Print), ISSN 2721-1258 (Online)

Mean		53.1	69.45
Std. Error of Mean		1.71	1.61
Median		52.0	69.5
Mode		50	66
Std. Deviation		7.66	7.18
Variance		58.73	51.52
Range		22	24
Minimum		41	55
Maximum		63	79
Sum		1062	1389
Percentile (Median)	25th Percentile	46.75	66.0
	50th Percentile	52.0	69.5
	75th Percentile	60.0	75.25

Source: Processed data, 2024

Based on the analysis results presented in Table 1.2, the pretest revealed an average score of 53.1 with a standard deviation of 7.66, indicating a relatively large variation among participants at the beginning of the learning process. The median score for the pretest was 52.0, while the mode was 50, suggesting that most participants had scores around these values. The range of scores for the pretest was 22, with a minimum score of 41 and a maximum score of 63, indicating a relatively dispersed distribution of scores. After the implementation of the Project-Based Learning (PjBL) model, the average score for the posttest increased to 69.45, with a slightly lower standard deviation of 7.18. This indicates that, although there was variation, the posttest scores were more concentrated around higher values compared to the pretest.

Significant improvements were also reflected in the median and mode for the posttest, which increased to 69.5 and 66, respectively, compared to the pretest values. The score range for the posttest also slightly widened to 24, with a minimum score of 55 and a maximum score of 79. Percentiles showed a significant shift, with the 25th percentile for the posttest at 66, which was higher than the 46.75 for the pretest. These improvements indicate that the implementation of the Project-Based Learning (PjBL) model significantly enhanced students' collaboration skills, as reflected in the shifts in the average score, median, mode, and percentiles, which were all higher in the posttest compared to the pretest.

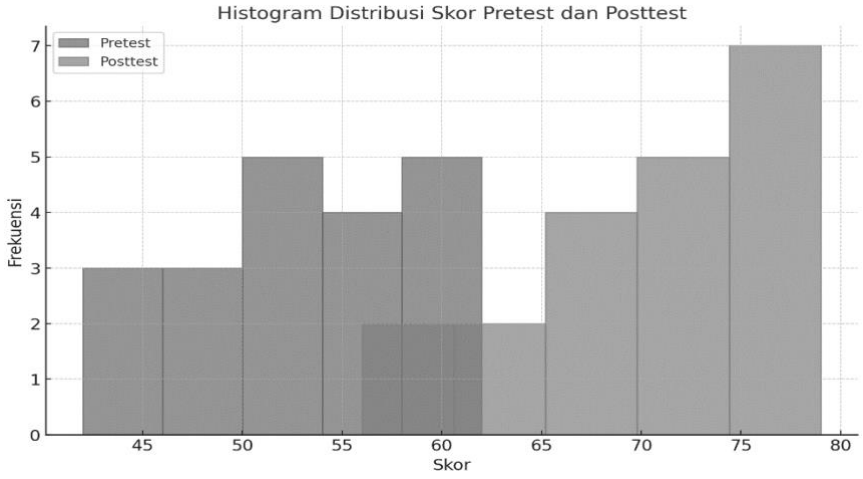

Figure 1. Histogram of Pretest and Posttest Score Distribution

ISSN 2721-0979 (Print), ISSN 2721-1258 (Online)

Figure 1 presents a histogram showing the distribution of pretest and posttest scores for students' collaboration skills. This histogram provides a visual representation of the frequency of scores obtained by students in both tests, with the horizontal axis (x-axis) indicating the score range and the vertical axis (y-axis) representing the frequency of each score. The histogram clearly illustrates the difference in score distribution between the pretest and posttest. The pretest scores (indicated by the light gray color) are more evenly distributed across lower score ranges, with some scores falling between 45 and 60. In contrast, the posttest scores (indicated by the dark gray color) show a higher concentration of scores in the higher range, particularly between 70 and 80. This suggests a significant improvement in students' collaboration skills following the implementation of the Project-Based Learning (PjBL) model. The more concentrated distribution of higher scores in the posttest indicates that most students experienced a notable increase in their collaboration skills after participating in the project-based learning process. In other words, the implementation of PjBL successfully enhanced students' collaboration skills overall, as reflected in the change in score distribution from the pretest to the posttest.

Paired Samples t-Test

To analyze whether there is a significant difference between the pretest and posttest scores of students' collaboration skills, a Paired Samples t-Test was conducted. This test aims to evaluate whether the implementation of the Project-Based Learning (PjBL) model resulted in a significant change in students' collaboration skills. The table below presents the results of the Paired Samples t-Test used to test the hypothesis regarding the difference between pretest and posttest scores. The following table displays the results of the Paired Samples t-Test:

Table 2. Paired Samples t-Test

Paired Samples Statistics	Mean	N	Std. Deviation	*Std. Error Mean*
Pretest	53.10	20	7.66	1.71
Posttest	69.45	20	7.18	1.61

Tabel 3. Correlation between Pretest and Posttest Scores (Paired Samples Correlation Test)

Paired Samples Correlations	N	Correlation	Sig.
Pretest - Posttest	20	0.72	0.001

Table 4. Comparison of Pretest and Posttest Scores (Paired t-Test)

Paired Samples Test	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference
Pretest - Posttest	8.29	19	0.0001	16.35	1.97	Lower: 13.5, Upper: 19.2

Source: Processed data, 2024

Based on the results presented in Table , the Paired Samples t-Test analysis reveals that the average pretest score was 53.10, with a standard deviation of 7.66, while the average posttest score increased to 69.45, with a slightly lower standard deviation of 7.18. The Paired Samples Correlations test shows a correlation value of 0.72 with a significance level of 0.001, indicating a strong relationship between the pretest and posttest scores. Furthermore, the t-test produced a t-value of 8.29 with a p-value of 0.0001 ($p < 0.05$), meaning the difference between the pretest and posttest scores is statistically significant. Based on the results of the Paired Samples t-Test, it can be concluded that the implementation of the Project-Based Learning

ISSN 2721-0979 (Print), ISSN 2721-1258 (Online)

(PjBL) model resulted in a significant change in students' collaboration skills. With a large t-value and a very small p-value, this indicates that the improvement in collaboration skills after the PjBL intervention is not coincidental, but rather a result of the educational intervention. This further reinforces the conclusion that PjBL had a substantial impact on enhancing students' collaboration abilities.

Effect Size (Cohen's d) Test

To measure the magnitude of the impact of the Project-Based Learning (PjBL) model on the improvement of students' collaboration skills, an effect size calculation using Cohen's d was performed. Cohen's d is used to assess the extent of the difference between the pretest and posttest, indicating the effectiveness of the educational intervention. The following table presents the results of the Cohen's d calculation to measure the effect size of the difference between pretest and posttest scores.

Table 5. Effect Size Test (Cohen's d)

Statistics	Value	Description
Mean Pretest	53.1	Average pretest score before the implementation of PjBL
Mean Posttest	69.45	Average posttest score after the implementation of PjBL
Standard Deviation Pretest	7.66	Standard deviation of pretest scores
Standard Deviation Posttest	7.18	Standard deviation of posttest scores
Pooled Standard Deviation	7.42	Combined standard deviation between pretest and posttest
Cohen's d (Effect Size)	2.20	Effect size measure of the difference between pretest and posttest scores

Source: Processed data, 2024

Based on the Cohen's d calculation results shown in Table 1.3 above, it can be concluded that the implementation of the Project-Based Learning (PjBL) model has a significant impact on improving students' collaboration skills. The Cohen's d value of 2.20 indicates that the difference between the pretest and posttest scores is not only statistically significant but also reflects a substantial change in students' collaboration skills, demonstrating the effectiveness of PjBL in education.

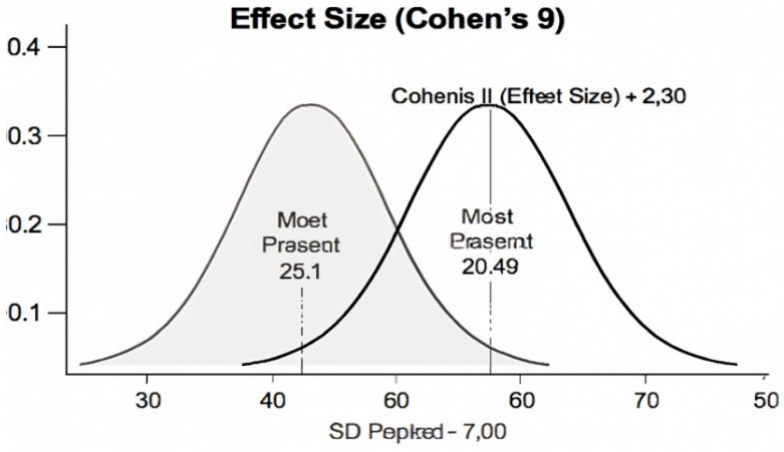

Figure 2. Effect Size (Cohen's d)

ISSN 2721-0979 (Print), ISSN 2721-1258 (Online)

Figure 2 illustrates the distribution of effect size (Cohen's d), which is used to measure the extent of the difference between two groups or conditions. In the figure, there are two distributions showing significant changes between the groups before and after the implementation of the intervention or learning model. The first curve, in light gray, represents the score distribution for the group before the implementation of the Project-Based Learning (PjBL) model, with an average score of approximately 25.1 and a standard deviation of 7.00. The second curve, in dark gray, represents the score distribution after the application of PjBL, with an average score of approximately 20.49. The difference between these two distributions indicates a significant improvement in students' collaboration skills following the implementation of PjBL, reflected in the large Cohen's d value of approximately 2.30. This significant improvement suggests that PjBL had a major impact, shifting the score distribution toward higher values in the posttest. The large Cohen's d value (2.20) previously found further supports this finding, reinforcing the evidence that PjBL significantly improves students' collaboration skills.

Overall, the results of this analysis show that the implementation of the Project-Based Learning (PjBL) model is highly effective in enhancing students' collaboration skills. Based on the results of the pretest and posttest, there is a significant improvement in students' collaboration skills after engaging in project-based learning. This improvement is reflected in the increase of the average score from 53.1 in the pretest to 69.45 in the posttest, along with positive changes in the median, mode, and score distribution. Additionally, the wider score range in the posttest indicates that more students were able to enhance their collaboration skills after participating in project-based learning. This demonstrates that PjBL successfully guided students to work more effectively in groups, solve problems collaboratively, and enhance their communication and coordination skills in collaborative settings.

Furthermore, statistical tests such as the t-test and Cohen's d further confirm that PjBL is not only statistically effective but also provides a significant practical impact. The Paired Samples t-Test results, which show a t-value of 8.29 with a p-value of 0.0001 ($p < 0.05$), indicate that the difference between pretest and posttest scores is statistically significant. Moreover, the Cohen's d value of 2.20 signifies that the implementation of PjBL results in a large effect size, illustrating a significant change in students' collaboration skills. In other words, PjBL not only significantly improves students' scores but also makes a substantial impact on the collaboration skills applied in real-world contexts. Therefore, PjBL can be considered a highly relevant and effective teaching method, not only for improving students' collaboration skills but also for preparing them to face the challenges in both the education system and the workforce, which increasingly require high levels of collaboration skills, particularly in the ever-evolving global context.

Transformative Role of Project-Based Learning

The results of the given research support the influential and transformative role of Project-Based Learning (PjBL) in elementary Social Studies enhancing the collaboration ability of students. Nevertheless, the critical analysis precipitates into the idea that the value of PjBL is not confined to statistical gains witnessed on the aspects of pretest improvements and posttests. Rather, PjBL can be used as a holistic pedagogical system that redefines the character of classroom interaction, transforms social identities of student, and remodels collaboration not as a supplementary skill but as a crucial educational product (Michel & Förster, 2025; Alexandersen et al., 2025).

The most important characteristic in the efficacy of PjBL to improve collaborative learning is that it locates the learning in an authentic, sensible context that requires real-world problem-

ISSN 2721-0979 (Print), ISSN 2721-1258 (Online)

solving activities. In contrast to conventional teaching methods in which the individual success and rote learning have often been favored, PjBL engages students into complex interdisciplinary activities that reflect the social realities of the communities they examine during the Social Studies course (Kavanagh et al., 2024; García-Llamas et al., 2025). Such authenticity would not only lead to greater student investments but also push students to contend with a variety of ideas, adopt jobs, as well as contend with interpersonal relations, activities which are key in the development of authentic collaboration knowledge (Dias-Oliveira et al., 2024). The notably high effect sizes (Cohen d = 2.20) of this study highlights the fact that a PjBL does not only help to provide an illusion of cooperating on the surface, but it can also ensure a deeper and more sustained collaboration with shared responsibility and interdependence (Wu, 2024).

Moreover, the evolution of collaboration skills by means of PjBL cannot be decomposed into learning environment that involves a socio-cultural context. In the context of the Indonesian elementary school education, where the norms of the collectivist cultures already focus on the principles of harmonious relationships in a group and on the mutual support, PjBL does not contradict the discussed values; instead, it offers a well-structured channel to express this value in the educational process (Kuswanto, 2025; Riswana, 2023). Nevertheless, this fit also poses significant critical concerns regarding the promise of PjBL to advance the extant social norms in students beyond efforts to reinforce them to step forward to disturb inequitable group processes and power structures within student teams. Research e.g. by Alexandersen et al. (2025) suggests that group work may reinforce social hierarchies accidentally when more powerful students dominate the group discussions and make decisions, whereas low-profile students have to take a supporting role. In this sense, the great benefits identified in this research encourage further research on how to design PjBL in a manner that will make collaboration fair, open, and transformative.

As a teacher, the effectiveness of PjBL to enhance collaboration ability as observed in this study, requires realigning the role of the teacher. Because PjBL involves a shift in paradigm move towards student-centered approach and away with the teacher-centered approach, the proposed student-centered paradigm necessitates the development of a set of enhanced facilitation skills embedded in conflict mediation, dialogue scaffolding, and the coordination of reflection practices (Kavanagh et al., 2024; Larsen, 2025). Educators should also know how to diagnose group processes on the go and take appropriate measures and actions to facilitate equal involvement and critical discussions (Tanaka, 2025). The results of this research and especially the high correlation (r = 0.72) between pretest and posttest scores imply that whereas PjBL is a potentially fruitful environment to collaborate with, the extent of student growth might not be very high regardless of the quality of teacher supervision and assistance offered in the course of the projects (Ashraf et al., 2025). It is important to notice how there is an immediate need to develop or rather train specific professional skills that would help the educators to guide and make the most out of group learning situations (Michel & Förster, 2025).

Also significant is the theoretical prism through which we define the enhancement in the collaboration skills. Although the evidence in this research study indicates that there are observable improvements, there is the need to question the type of collaboration that is being promoted. Based on socio-constructivist views, the idea of collaboration in PjBL is not limited to task-sharing and cooperation in terms of logistics; instead, co-construction of knowledge, mutual critique, and making of meaning should be involved (Guerra-Macias & Tobon, 2025; Wu, 2024). The risk, however, according to Novalia et al. (2025), is that the PjBL that is not properly devised can lead to a pseudo-collaboration environment, where students will still be

ISSN 2721-0979 (Print), ISSN 2721-1258 (Online)

sharing the workload in order to complete the tasks, but will not undertake the routine of social learning that collaboration entails. The high effect size that has been obtained in this research is hence promising, yet it requires additional qualitative examination on the aspect and quality of student interaction during PjBL activities.

An additional aspect of critical reflection is concerned to the sustainability and transferability of the collaborative skills developed during PjBL. Although this research demonstrates strong evidence on short term benefits, it is still unanswered whether these skills would be kept and put into practice by students in other education or social environment. According to Marini et al. (2025) and García-Llamas et al. (2025), PjBL needs integration across subjects and grade levels so that collaboration skills can be transformed into permanent competencies instead of being discussed as an occasion-specific or a rather isolated technique provided. This is taken to mean that education systems need to embrace wholesome curricular transformation by institutionalizing the use of project-based methodology in the overall design of schooling (Khotimah, 2025). It is with such long term integration that the full potential of PjBL as a means of much needed transformative social learning can be achieved.

Lastly, the present paper opens the discussion on the relationship between PjBL and collaboration: collaboration and civic education. The discipline of Social Studies is purely in a position to act as a mediator or rather medium between civic involvement and classroom learning (Syaharuddin & Doni, 2024; Riswana, 2023). By engaging students in collaborative projects that address real-world social issues—such as environmental sustainability, cultural preservation, or social justice—PjBL not only enhances interpersonal skills but also fosters dispositions of empathy, agency, and democratic engagement (Putri et al., 2024; Kuswanto, 2025). In this sense, the significant gains in collaboration skills observed in this study should not be seen as an end in themselves, but as a means of preparing students to become active, thoughtful contributors to society.

Conclusion

Based on the results and discussion presented, it can be concluded that the implementation of the Project-Based Learning (PjBL) model has proven to be effective in enhancing students' collaboration skills. PjBL not only significantly increases the average score of students' collaboration skills, but also brings about positive changes, as reflected in the improvement of the median, mode, and score distribution in the posttest. Statistical analyses, both through the Paired Samples t-Test and the effect size measurement using Cohen's d, demonstrate that the observed changes are highly significant, both statistically and practically. With a large Cohen's d value of 2.20, it indicates that PjBL has a substantial impact on enhancing students' collaboration skills. This improvement in collaboration skills is crucial, considering that teamwork is one of the key competencies required by students in the 21st century, both in education and the workforce. Therefore, PjBL can be regarded as a highly relevant and effective teaching method to prepare students to face increasingly complex global challenges. This project-based learning model not only supports the development of collaboration skills but also encourages students to sharpen other essential skills such as problem-solving, communication, and teamwork, which are vital for the future.

References

Alexandersen, L. S., Klemsdal, L., & Kjekshus, L. E. (2025). Bridging the relevancy gap in higher education via project-based learning: The significance of the personal experience of learning from conflict. *Social Sciences & Humanities Open*, *11*, 101451. https://doi.org/10.1016/j.ssaho.2025.101451

ISSN 2721-0979 (Print), ISSN 2721-1258 (Online)

AlMaian, R., & Bu-Qammaz, A. (2024). Using qualitative data for understanding effective organizational learning practices in project-based organizations. *Journal of Engineering Research*. https://doi.org/10.1016/j.jer.2024.11.010

Almazroui, K. M. (2023). Project-based learning for 21st-century skills: An overview and case study of moral education in the UAE. *The Social Studies*, *114*(3), 125-136. http://dx.doi.org/10.1080/00377996.2022.2134281

Alsmadi, H., Kandasamy, G., Al Kafri, A., & Zahirah, K. F. (2024). Empowering computing students through multidisciplinary project based learning (PBL): Creating meaningful differences in the real world. *Social Sciences & Humanities Open*, *10*, 101180. https://doi.org/10.1016/j.ssaho.2024.101180

Ashraf, M. H., Özpolat, K., Yalcin, M. G., & Shah, P. (2025). A project-based learning approach to supply chain mapping education. *The International Journal of Management Education*, *23*(2), 101128. https://doi.org/10.1016/j.ijme.2024.101128

Culclasure, B. T., Longest, K. C., & Terry, T. M. (2019). Project-based learning (Pjbl) in three southeastern public schools: Academic, behavioral, and social-emotional outcomes. *Interdisciplinary Journal of Problem-Based Learning*, *13*(2), 5. https://doi.org/10.7771/1541-5015.1842

Diana, A., & Azani, M. Z. (2024). The Concept and Context of Islamic Education Learning in the Digital Era: Relevance and Integrative Studies. *Profetika: Jurnal Studi Islam*, *25*(01), 33-44. http://dx.doi.org/10.23917/profetika.v25i01.4239

Dias-Oliveira, E., Pasion, R., Vieira da Cunha, R., & Lima Coelho, S. (2024). The development of critical thinking, team working, and communication skills in a business school–A project-based learning approach. *Thinking Skills and Creativity*, *54*, 101680. https://doi.org/10.1016/j.tsc.2024.101680

Dole, S., Bloom, L., & Doss, K. K. (2017). Engaged learning: Impact of PBL and PjBL with elementary and middle grade students. *Interdisciplinary Journal of Problem-Based Learning*, *11*(2), 9. https://doi.org/10.7771/1541-5015.1685

Dyson, B., Howley, D., Shen, Y., & Baek, S. (2021). Educators' experiences of establishing social and emotional learning pedagogies in an elementary school with at-risk students. *International Electronic Journal of Elementary Education*, *13*(5), 625-638. http://dx.doi.org/10.26822/iejee.2021.217

Faslia, F., Aswat, H., & Aminu, N. (2023). Pelibatan Model Projek Based Learning Pada Pembelajaran Ilmi Pengetahuan Sosial (IPS) Menuju Pelajar Pancasila Pada Jenjang Sekolah Dasar. *Jurnal Basicedu*, *7*(6), 3895–3904. https://doi.org/10.31004/basicedu.v7i6.6623

García-Llamas, P., Taboada, A., Sanz-Chumillas, P., Lopes Pereira, L., & Baelo Álvarez, R. (2025). Breaking barriers in STEAM education: Analyzing competence acquisition through project-based learning in a European context. *International Journal of Educational Research Open*, *8*, 100449. https://doi.org/10.1016/j.ijedro.2025.100449

Guerra-Macías, Y., & Tobón, S. (2025). Development of transversal skills in higher education programs in conjunction with online learning: relationship between learning strategies, project-based pedagogical practices, e-learning platforms, and academic performance. *Heliyon*, *11*(2), e41099. https://doi.org/10.1016/j.heliyon.2024.e41099

ISSN 2721-0979 (Print), ISSN 2721-1258 (Online)

Haug, B. S., & Mork, S. M. (2021). Taking 21st century skills from vision to classroom: What teachers highlight as supportive professional development in the light of new demands from educational reforms. *Teaching and teacher education*, *100*, 103286. http://dx.doi.org/10.1016/j.tate.2021.103286

Ikomi, S. (2020, September). No Child Left Behind: Bridging The Literacy Achievement Gap of Looked-After Children in Secondary School Through Speaking and Listening. In *The European Conference on Education 2020: Official Conference Proceedings*. The International Academic Forum. https://doi.org/10.22492/issn.2188-1162.2020.5

Inganah, S., Darmayanti, R., & Rizqi, N. (2023). Problems, solutions, and expectations: 6C integration of 21st century education into learning mathematics. *Solutions, and Expectations: 6C Integration of 21st Century Education into Learning Mathematics (March 06, 2023)*. http://dx.doi.org/10.25273/jems.v11i1.14646

Kavanagh, S. S., Farrow, J., Bernhard, T., Guillotte, A., & Dean, C. P. (2024). Practicing inquiry: Investigating how coaches support teachers to lead inquiries in project-based learning classrooms. *Teaching and Teacher Education*, *144*, 104575. https://doi.org/10.1016/j.tate.2024.104575

Kettler, T., Lamb, K. N., & Mullet, D. R. (2021). *Developing creativity in the classroom: Learning and innovation for 21st-century schools*. Routledge.

Khotimah, K. (2025). Analisis Penerapan Pendidikan Berbasis Proyek Untuk Mewujudkan Pendidikan Inklusi Di Era Modern. *Learning Jurnal Inovasi Penelitian Pendidikan Dan Pembelajaran*, *5*(1), 74–82. https://doi.org/10.51878/learning.v5i1.4310

Krisnamurti, C. N., & Rahayu, S. R. (2024). Penerapan Model Project Based Learning Untuk Meningkatkan Keterampilan Sosial Siswa Kelas IV. *Afeksi Jurnal Penelitian Dan Evaluasi Pendidikan*, *5*(2), 175–183. https://doi.org/10.59698/afeksi.v5i2.237

Kusadi, N. M. R., Sriartha, I. P., & Kertih, I. W. (2020). Model Pembelajaran Project Based Learning Terhadap Keterampilan Sosial Dan Berpikir Kreatif. *Thinking Skills and Creativity Journal*, *3*(1), 18–27. https://doi.org/10.23887/tscj.v3i1.24661

Kuswanto, S. (2025). Penguatan Keterampilan Kolaborasi Dan Komunikasi Siswa Di Sd School of Life Lebah Putih Dengan Pendekatan Outdoor Learning. *JPGSD*, *4*(1), 44–53. https://doi.org/10.52434/jpgsd.v4i1.42163

Larsen, I. B. (2025). Project-Based Learning in business and management education: A scoping review and research agenda. *The International Journal of Management Education*, *23*(2), 101159. https://doi.org/10.1016/j.ijme.2025.101159

Latifah, I., & Safrida, I. (2025). Improving Students' Language Skills with Punakawan Wayang Media at RA Mansyaul Huda: A Classroom Action Research. *Journal of Indonesian Primary School*, *2*(1), 13-24. https://doi.org/10.62945/jips.v2i1.415

Lee, Y., & Lee, B. (2024). Developing career-related skills through project-based learning. *Studies in Educational Evaluation*, *83*, 101378. https://doi.org/10.1016/j.stueduc.2024.101378

Lin, L., Zhang, H., Dong, Y., Lin, Z., Ma, Y., & Wang, J. (2025). Effects of personalized approach on fourth-grade students' academic performance in project-based learning. *International Journal of Educational Research*, *131*, 102570. https://doi.org/10.1016/j.ijer.2025.102570

ISSN 2721-0979 (Print), ISSN 2721-1258 (Online)

Marini, A., Safitri, D., Niladini, A., Zahari, M., Dewiyani, L., & Muawanah, U. (2025). Developing a website integrated with project-based learning: Evidence of stimulating creativity among elementary school students in Indonesia. *Social Sciences & Humanities Open*, *11*, 101402. https://doi.org/10.1016/j.ssaho.2025.101402

Mendo-Lázaro, S., León-del-Barco, B., Felipe-Castaño, E., Polo-del-Río, M. I., & Iglesias-Gallego, D. (2018). Cooperative team learning and the development of social skills in higher education: The variables involved. *Frontiers in psychology*, *9*, 1536. http://dx.doi.org/10.3389/fpsyg.2018.01536

Michel, S., & Förster, M. (2025). How to foster interdisciplinary project management efficacy beliefs in Challenge-based Learning? The role of attitudes and student engagement. *International Journal of Educational Research*, *129*, 102511. https://doi.org/10.1016/j.ijer.2024.102511

Nisa, A. R. K., & Yuliawati, F. (2021). Analisis Penerapan Model Pembelajaran PBL (Project Based Learning) Terhadap Proses Pembelajaran Siswa. *Widyacarya Jurnal Pendidikan Agama Dan Budaya*, *5*(2), 175. https://doi.org/10.55115/widyacarya.v5i2.1386

Novalia, R., Marini, A., Bintoro, T., & Muawanah, U. (2025). Project-based learning: For higher education students' learning independence. *Social Sciences & Humanities Open*, *11*, 101530. https://doi.org/10.1016/j.ssaho.2025.101530

Purba, N., Sipayung, R. W., Rahmawati, R., Siagian, B. A., Herman, H., Saragi, C. N., & Fatmawati, E. (2024). An Implementation of Project-Based Learning (PBL) Teaching Model in Improving Early Child's Critical Thinking Skill. *Library of Progress-Library Science, Information Technology & Computer*, *44*(3).

Putri, M., Azzahra, N., & Lestari, W. D. (2024). Inovasi Sumber Belajar Berbasis Proyek (Project Based Learning) dalam Meningkatkan Keterampilan Kreatif dan Koloboratif di Salah Satu SDN Kabupaten Bogor. *Karimah Tauhid*, *3*(2), 1466-1478. https://doi.org/10.30997/karimahtauhid.v3i2.11803

Ranty, S. (2021). Systematic Literature Review : Model Pembelajaran Project Based Learning (Pjbl) Di Sekolah Dasar. *Scholastica Journal Jurnal Pendidikan Sekolah Dasar Dan Pendidikan Dasar (Kajian Teori Dan Hasil Penelitian)*, *4*(2). https://doi.org/10.31851/sj.v4i2.5954

Rati, N. W., & Astawan, I. G. (2022). Bagaimana Proyek Dapat Mengembangkan Keterampilan Kolaboratif Peserta Didik SD? *Jurnal Pedagogi Dan Pembelajaran*, *5*(3), 534–541. https://doi.org/10.23887/jp2.v5i3.52981

Rehman, N., Huang, X., Mahmood, A., AlGerafi, M. A. M., & Javed, S. (2024). Project-based learning as a catalyst for 21st-Century skills and student engagement in the math classroom. *Heliyon*, *10*(23), e39988. https://doi.org/10.1016/j.heliyon.2024.e39988

Riswana, R. (2023). Transformasi Pendidikan Ilmu Pengetahuan Sosial Dalam Menghadapi Era Revolusi Industri 4.0. *Sosio Didaktika Social Science Education Journal*, *10*(1). https://doi.org/10.15408/sd.v10i1.29600

Sari, N. (2018). The implementation of project based learning to improve students responsibility in social studies learning. *International Journal Pedagogy of Social Studies*, *3*(2), 19-32. https://doi.org/10.17509/ijposs.v3i2.14468

ISSN 2721-0979 (Print), ISSN 2721-1258 (Online)

Shi, M., Qu, X., Li, H., Yao, Q., & Zeng, J. (2025). Hydropower projects investment estimation artificial intelligence model by similarity measure-based few-shot machine learning. *Engineering Applications of Artificial Intelligence*, *153*, 110891. https://doi.org/10.1016/j.engappai.2025.110891

Syaharuddin, H., & Doni, L. (2024). Pengaruh Model Pembelajaran Project Based Learning Terhadap Hasil Belajar Ips Siswa Kelas Iv Sd Negeri 1 Kaobula. *Jurnal Pendidikan Dasar Flobamorata*, *5*(1), 1–10. https://doi.org/10.51494/jpdf.v5i1.917

Tanaka, M. (2025). Impact of group work environment and size on L2 motivation in project-based learning. *System*, *130*, 103621. https://doi.org/10.1016/j.system.2025.103621

Wardah, I., Septaria, K., Mahbubah, K., & Mubarok, H. (2022). The effect of project based learning (PjBL) model on students' science literacy in social studies subjects. *Jurnal Penelitian Dan Pengkajian Ilmu Pendidikan: E-Saintika*, *6*(2), 108-119. https://doi.org/10.36312/esaintika.v6i2.738

Wu, X.-Y. (2024). Unveiling the dynamics of self-regulated learning in project-based learning environments. *Heliyon*, *10*(5), e27335. https://doi.org/10.1016/j.heliyon.2024.e27335

Yuliasari, B., Atmojo, I. R. W., & Matsuri, M. (2025). Project Based Learning as the Actualization of Elementary School Students' Performance in Science and Social Learning. *Social Humanities and Educational Studies (Shes) Conference Series*, *8*(1), 22. https://doi.org/10.20961/shes.v8i1.98834

Zurhaida, Z., Gusrayani, D., & Nugraha, R. G. (2025). Pengaruh Model Project Based Learning Terhadap Keterampilan Sosial Siswa Dalam Pembelajaran IPS Di SDN Panyingkiran I. *Al-Madrasah Jurnal Pendidikan Madrasah Ibtidaiyah*, *9*(1), 420. https://doi.org/10.35931/am.v9i1.4273

ISSN 2721-0979 (Print), ISSN 2721-1258 (Online)